
SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:

1. Structural glazed facing tile (SGFT).
2. Prefaced concrete masonry units.
3. Mortar and grout.
4. Reinforcing steel.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

NOTE: Structural Glazed Facing Tile and Factory Glazed Concrete Masonry Units are intended as substitutes for each other and area identified on the drawings as Glazed Facing Tile. In his/her bid, the contractor shall identify which material is used for coordination with and finalization of color selection for other materials and finishes. Other prefaced concrete masonry units incorporated in the work include polished ground face block.

- B. Related Sections include the following:

1. Division 2 Section "Segmental Retaining Walls" for dry-laid, concrete unit retaining walls.
2. Division 4 Section "Glass Unit Masonry Assemblies" for glass block.



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- 3. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - C. Products furnished, but not installed, under this Section include the following:
 - 1. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 5 Section "Structural Steel."
 - D. Products installed, but not furnished, under this Section include the following:
 - 1. Steel lintels and shelf angles for unit masonry, furnished under Division 5 Section "Metal Fabrications."
 - 2. Hollow-metal frames in unit masonry openings, furnished under Division 8 Section "Steel Doors and Frames."

1.3 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Ceramic-Glazed Clay Facing Tile and Prefaced Concrete Masonry Units: Show coursing and location of special shapes.
 - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection: For the following:
 - 1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
 - 2. Colored mortar Samples showing the full range of colors available.
- D. Samples for Verification: For the following:

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1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
 2. Colored mortar Samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project.
 3. Weep holes/vents in color to match mortar color.
 4. Accessories embedded in the masonry.
- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Government and approved in writing.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- G. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
1. Mortar complying with property requirements of UBC Standard 21-15.
 2. Grout mixes complying with compressive strength requirements of UBC Standard 21-19. Include description of type and proportions of grout ingredients.
- H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.



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- a. Include size-variation data, verifying that actual range of sizes falls within specified tolerances.
 2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 3. Each material and grade indicated for reinforcing bars.
 4. Each type and size of joint reinforcement.
 5. Each type and size of anchor, tie, and metal accessory.
- I. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Sample Panels: Before installing unit masonry, build sample panels, using materials indicated for the completed Work, to verify selections made under sample Submittals and to demonstrate aesthetic effects. Build sample panels for each type of exposed unit masonry assembly in sizes approximately **48 inches (1200 mm)** long by **48 inches (1200 mm)** high by full thickness.
 1. Locate panels in the locations indicated or, if not indicated, as directed by Government.
 2. Clean exposed faces of panels with masonry cleaner indicated.
 3. Protect approved sample panels from the elements with weather-resistant membrane.
 4. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.



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5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by the Government in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by the Government in writing.
 6. Demolish and remove sample panels when directed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS



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- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
 2. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 3. Protect sills, ledges, and projections from mortar droppings.
 4. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 5. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in Section 2104.3 of the Uniform Building Code.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 degrees F (4 degrees C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- C. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
1. When ambient temperature exceeds 100 degrees F (38 degrees C), or 90 degrees F (32 degrees C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 GLAZED-CLAY FACING TILE

UNIT MASONRY ASSEMBLIES



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- A. General: Comply with the following requirements applicable to each form of unit required:
1. Provide multi-cored units designed for use in reinforced, grouted masonry; either with vertical cores and with webs notched to receive reinforcement, or with horizontal cores and with holes in bed shells for placement of grout and to receive reinforcement.
 2. Provide units recommended by manufacturer for exterior use in Project's location.
 3. Colors and Pattern: Provide different colors in quantities necessary to construct patterns and designs shown. Colors and finishes as manufactured by Trenwyth Industries, Inc. are listed for scheduling purposes and to establish design intent. Final selection of all colors is to be coordinated with those selected for all adjacent and nearby materials.
 - a. Field colors: "Peach Fuzz," "Canella," and "Safari Beige."
 - b. Accent stripe and sill color: "Ivory."
 - c. Pattern colors: "Ebony," "Warm Spice," and "Ivory."
 - d. Base under glass block: "Teal."
 4. Provide special shapes where required for corners, jambs, coved bases, sills, and other special conditions indicated, including applications that cannot be produced by sawing standard units.
 - a. Provide bullnose units for outside corners, unless otherwise indicated.
 - b. Provide mitered internal corners.
 5. Provide special units glazed on ends and tops, as well as faces for corners, jambs, sills, pilasters, columns, and other applications indicated, where glazed units are exposed on other surfaces and faces.
 6. Provide different colors to create patterns and designs shown .
- B. Glazed Clay Facing Tile: ASTM C 126, Grade SS (Select Sized or Ground Edged):
1. Type I (single-faced units), where only one finished face is exposed when units are installed. Provide corner pieces and special sizes as required to provide finished product as shown.



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2. Sizes: 4W Series with actual face dimensions of 3-3/4 inches (95 mm) wide by 7-3/4 inches (197 mm) high by 7-3/4 inches (197 mm) long.

2.2 PREFACED CONCRETE MASONRY UNITS

- A. Prefaced and Polished Ground Face Concrete Masonry Units: Lightweight concrete units indicated below with manufacturer's standard smooth resinous tile facing, complying with ASTM C 744.
 1. Concrete Masonry Units: ASTM C 90, Type I, moisture-controlled, hollow units.
 2. Size: Manufactured to dimensions indicated for unfaced units, with actual face dimensions of 3-3/4 inches (95 mm) wide by 7-3/4 inches (197 mm) high by 7-3/4 inches (197 mm) long with modular coursing.
 3. Provide special shapes where required for corners, jambs, coved bases, sills, and other special conditions indicated, including applications that cannot be produced by sawing standard units.
 - a. Provide bullnose units for outside corners, unless otherwise indicated.
 - b. Provide mitered internal corners.
 4. Finish: Provide polished ground face concrete block units with a gloss reading of no less than 70. Units are to be factory treated with a protective film to facilitate on-the-job cleaning.
 5. Colors and Pattern: Provide different colors in quantities necessary to construct patterns and designs shown. Colors and finishes as manufactured by Burns and Russell Company as Spectra-Glaze II are listed for scheduling purposes and to establish design intent. Final selection of all colors is to be coordinated with those selected for all adjacent and nearby materials.
 - a. Field color: "Rose Pink."
 - b. Accent color: "Champagne Beige"
 - c. Accent stripe and color: "Custom Clear."
 - d. Pattern colors: "Special Brown," "Deep sierra Red," and "Custom Clear."



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6. Polished Ground Face Block Color and Pattern: Colors and finishes as manufactured by Premier Block Corporation as Elite High Polished are listed for scheduling purposes and to establish design intent. Final selection of all colors is to be coordinated with those selected for all adjacent and nearby materials..
- a. Field color: "Autumn Oakleaf."
 - b. Accent color: "Warm Stone."

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: UBC Standard 21-13, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Mortar Cement: UBC Standard 21-14.
- E. Masonry Cement: UBC Standard 21-11.
 - 1. For pigmented mortar, use a colored cement formulation as required to produce the color indicated or, if not indicated, as selected from manufacturer's standard formulations.
 - a. Pigments shall not exceed 10 percent of portland cement by weight for mineral oxides nor 2 percent for carbon black.
- F. Aggregate for Mortar: ASTM C 144; except for joints less than **1/4 inch (6 mm)** thick, use aggregate graded with 100 percent passing the **No. 16 (1.18-mm)** sieve.
 - 1. Colored-Mortar Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

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- G. Aggregate for Grout: ASTM C 404.
 - H. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
 - I. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of the units); in color indicated or, if not otherwise indicated, as selected from manufacturer's colors.
 - J. Water: Potable.
 - K. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Colored Portland Cement-Lime Mix:
 - a. Color Mortar Blend; Glen-Gery Corporation.
 - b. Centurion Colorbond PL; Lafarge Corporation.
 - c. Lehigh Custom Color Portland/Lime; Lehigh Portland Cement Co.
 - 2. Mortar Cement:
 - a. Magnolia Superbond Mortar Cement; Blue Circle Cement.
 - b. Lafarge Mortar Cement; Lafarge Corporation.
 - 3. Mortar Pigments:
 - a. True Tone Mortar Colors; Davis Colors.
 - b. Centurion Pigments; Lafarge Corporation.
 - c. SGS Mortar Colors; Solomon Grind-Chem Services, Inc.

2.4 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, **Grade 60** (Grade 400).

2.5 MASONRY JOINT REINFORCEMENT

- A. General: UBC Standard 21-10 and as follows:
 - 1. Hot-dip galvanized, carbon-steel wire for exterior walls.
 - 2. Wire Size for Side Rods: W2.8 or 0.188-inch (5-mm)] diameter.
 - 3. Wire Size for Cross Rods: W2.8 or 0.188-inch (5-mm)] diameter.
 - 4. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units where indicated.
- B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches (400 mm) o.c.

2.6 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.
- B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
- C. Steel Sheet, Galvanized after Fabrication: ASTM A 366/A 366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153.

2.7 BENT WIRE TIES

- A. General: Rectangular units with closed ends and not less than 4 inches (100 mm) wide. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
- B. Wire: Fabricate from 1/4-inch- (6-mm-) diameter, hot-dip galvanized steel wire.
 - 1. Finish: Hot-dip galvanized to comply with ASTM A 153.

2.8 ADJUSTABLE MASONRY-VENEER ANCHORS

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
1. Structural Performance Characteristics: Capable of withstanding a **100-lbf (445-N)** load in both tension and compression without deforming or developing play in excess of **0.05 inch (1.3 mm)**.
- B. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie section and a metal anchor section complying with the following requirements:
1. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, **2-3/4 inches (70 mm)** wide by **3 inches (75 mm)** high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
 - a. Plate **1-1/4 inches (32 mm)** wide by **6 inches (150 mm)** long with strap **5/8 inch (16 mm)** wide by **3-5/8 inches (92 mm)** long; slot clearance formed between face of plate and back of strap shall not exceed diameter of wire tie by more than **1/32 inch (0.8 mm)**.
 2. Wire Tie Section: Triangular-shaped wire tie sized to extend at least halfway through veneer but with at least **5/8-inch (16-mm)** cover on outside face.
 3. Fabricate sheet metal anchor sections and other sheet metal parts from **0.0966-inch- (2.5-mm-)** thick, steel sheet, galvanized after fabrication.
 4. Fabricate wire ties from **0.25-inch- (6-mm-)** diameter, hot-dip galvanized steel wire.
- C. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint, complying with the following requirements:
1. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, **2-3/4 inches (70 mm)** wide by **3 inches (75 mm)** high; with projecting tabs having slotted holes for inserting vertical leg of connector section.

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2. Connector Section: Rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire. Size connector to extend at least halfway through veneer but with at least **5/8-inch (16-mm)** cover on outside face.
- D. Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, **No. 10 (5-mm)** diameter by length required to penetrate steel stud flange by not less than 3 exposed threads, and with a corrosion protective coating.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Screw-Attached, Masonry-Veneer Anchors:
 - a. D/A 213; Dur-O-Wal, Inc.
 - b. RJ-711; Masonry Reinforcing Corporation of America.
 2. Seismic Masonry-Veneer Anchors:
 - a. D/A 213S; Dur-O-Wal, Inc.
 - b. RJ-711 with Wire-Bond clip; Masonry Reinforcing Corporation of America.
 3. Organic-Polymer-Coated, Steel Drill Screws:
 - a. Dril-Flex; Elco Industries, Inc.
 - b. Traxx; ITW-Buildex.
 4. Stainless-Steel Drill Screws for Steel Studs:
 - a. Stainless Steel SX Fastener; Dur-O-Wal, Inc.

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Fabricate from the following metal complying with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim" and below:
1. Stainless Steel: **0.0156 inch (0.4 mm)** thick.

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2. Fabricate through-wall metal flashing embedded in masonry from sheet metal indicated above and with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond.
- B. Contractor's Option for Concealed Flashing: For flashing partly exposed to the exterior, use metal flashing specified above. For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Copper-Laminated Flashing: Manufacturer's standard laminated flashing consisting of 7-oz./sq. ft. (2-kg/sq. m) sheet copper bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 2. Rubberized-Asphalt Flashing: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of 0.040 inch (1.0 mm).
 3. EPDM Flashing: Manufacturer's standard flashing product formed from a terpolymer of ethylene-propylene diene, complying with ASTM D 4637, 0.040 inch (1.0 mm) thick.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Sheet Metal Flashing and Trim."
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for bonding flashing sheets to each other and to substrates.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Copper-Laminated Flashing:
 - a. Copper Fabric Flashing; Advanced Building Products, Inc.
 - b. Copper Fabric; AFCO Products, Inc.
 - c. H & B C-Fab Flashing; Hohmann & Barnard, Inc.
 2. Rubberized-Asphalt Flashing:
 - a. Dur-O-Barrier; Dur-O-Wal, Inc.
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- b. Perm-A-Barrier Wall Flashing; W. R. Grace & Co., Construction Products Division.
- c. Textroflash; Hohmann & Barnard, Inc.
- 3. EPDM Flashing:
 - a. FlashGuard; Firestone Building Products.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
 - 1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch (10-mm) OD by 4 inches (100 mm) long.
- E. Cavity Drainage Material: 1-inch- (25-mm-) thick, free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.
- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.187-inch (5-mm) steel wire, hot-dip galvanized after fabrication.
 - 1. Provide units with either two loops or four loops as needed for number of bars.

2.11 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup (118 mL) dry measure tetrasodium polyphosphate and 1/2-cup (118 mL) dry measure laundry detergent dissolved in 1 gallon (4 L) of water. A non-acid detergent is to be used for final clean-up of high polished units.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride in mortar or grout.
- B. Pre-blended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with UBC Standard 21-15, Proportion Specification.
 - 1. Extended-Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above, at Contractor's option.
 - 2. Limit cementitious materials in mortar for exterior masonry to portland cement, mortar cement, and lime.
 - 3. For masonry below grade, in contact with earth, and where indicated, use Type M or RM.
 - 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N or RN.
- D. Grout for Unit Masonry: Comply with UBC Standard 21-19.

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1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with UBC Table 21-C for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.
- E. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's directions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build walls to the actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.



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- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
 - D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
 - E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/4 inch in 20 feet (6 mm in 6 m)**, nor **1/2 inch (12 mm)** maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, nor **1/2 inch (13 mm)** maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than **1/4 inch in 20 feet (6 mm in 6 m)**, nor **1/2 inch (13 mm)** maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a maximum thickness limited to **1/2 inch (13 mm)**. Do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch (3 mm)**.



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- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**. Do not vary from adjacent bed-joint and head-joint thickness by more than **1/8 inch (3 mm)**.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thickness and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
1. Stack bond.
- C. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay clay tile as follows:
1. Lay vertical-cell units with full head joints, unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.
 2. Lay horizontal-cell units with full bed joints, unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.
 3. Maintain joint thickness indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with **1/4- to 3/8-inch- (6- to 10-mm-)** thick joints.

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4. Where epoxy-mortar pointed joints are indicated, rake out setting mortar to a uniform depth of **1/4 inch (6 mm)** and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
 - B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
 1. For glazed masonry units, use a nonmetallic jointer **3/4 inch (19 mm)** or more in width.
 - C. Collar Joints in Clay Tile Masonry: After each course is laid, fill the vertical, longitudinal joint between wythes solidly with mortar at exterior walls.

3.6 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
 1. Space reinforcement not more than **16 inches (400 mm)** o.c.
 2. Space reinforcement not more than **8 inches (200 mm)** o.c. in parapet walls.
 3. Provide reinforcement not more than **8 inches (200 mm)** above and below wall openings and extending **12 inches (300 mm)** beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer

for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with seismic masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten each anchor section through sheathing to wall framing with two metal fasteners of type indicated.
 - 2. Embed connector sections and continuous wire in masonry joints. Provide not less than **2 inches (50 mm)** of air space between back of masonry veneer and face of sheathing.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than **18 inches (450 mm)** o.c. vertically and **24 inches (600 mm)** o.c. horizontally, with not less than 1 anchor for each **2 sq. ft. (0.2 sq. m)** of wall area. Install additional anchors within **12 inches (300 mm)** of openings and at intervals, not exceeding **8 inches (200 mm)**, around the perimeter.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form expansion joints as follows:
 - 1. Form open joint of width indicated, but not less than **3/8 inch (10 mm)** for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.

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- C. Build in horizontal, pressure-relieving joints; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants."
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.10 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than **12 inches (300 mm)** for brick-size units and **24 inches (600 mm)** for block-size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.
- C. Provide minimum bearing of **8 inches (200 mm)** at each jamb, unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C. Install flashing as follows:



1. At masonry-veneer walls, extend flashing from exterior face of veneer, through veneer, up face of sheathing at least **8 inches (200 mm)**, and behind air-infiltration barrier or building paper.
 2. At lintels and shelf angles, extend flashing a minimum of **4 inches (100 mm)** into masonry at each end. At heads and sills, extend flashing **4 inches (100 mm)** at ends and turn flashing up not less than **2 inches (50 mm)** to form a pan.
 3. Extend sheet metal flashing **1/2 inch (13 mm)** beyond face of masonry at exterior and turn flashing down to form a drip.
 4. Install metal drip edges beneath flashing at exterior face of wall. Stop flashing **1/2 inch (13 mm)** back from outside face of wall and adhere flashing to top of drip edge.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Space weep holes **24 inches (600 mm)** o.c.
 2. In cavities, place pea gravel to a height equal to height of first course, but not less than **2 inches (50 mm)**, immediately above top of flashing embedded in the wall, as masonry construction progresses, to splatter mortar droppings and maintain drainage.

3.12 PARGING

- A. Parge pre-dampened masonry walls, where indicated, with Type S or Type N mortar applied in 2 uniform coats to a total thickness of **3/4 inch (19 mm)**. Scarify first parge coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of **1/8 inch per foot (3 mm per 300 mm)**. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect the parging until cured.

3.13 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Government's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
 - 5. Clean masonry with cleaner applied according to manufacturer's written instructions.

3.14 MASONRY WASTE DISPOSAL

- A. Recycling: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

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- B. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 2 Section "Earthwork."
 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04810